

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I declare that:

My residence, post office address and citizenship are as stated below next to my name; I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **MAXIMUM LIKELIHOOD SEQUENCE ESTIMATOR WHICH COMPUTES BRANCH METRICS IN REAL TIME** the specification of which X is attached hereto or ____ was filed on _____ as Application No. _____ and was amended on _____ (if applicable).

I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56. I claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Country	Application No.	Date of Filing	Priority Claimed Under 35 USC 119

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below:

Application No.	Filing Date
60/147,506	08/09/99

I claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Application No.	Date of Filing	Status

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

J. Matthew Zigmant, Reg. No. 44,005
Gary T. Aka, Reg. No. 29,038

Send Correspondence to: J. Matthew Zigmant TOWNSEND and TOWNSEND and CREW LLP Two Embarcadero Center, 8th Floor San Francisco, California 94111-3834	Direct Telephone Calls to: (Name, Reg. No., Telephone No.) Name: J. Matthew Zigmant Reg. No.: 44,005 Telephone: 650-326-2400
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Full Name of Inventor 1:	Last Name: POPE	First Name: STEPHEN	Middle Name or Initial: P.	
Residence & Citizenship:	City: Berkeley	State/Foreign Country: California	Country of Citizenship: United States	
Post Office Address:	Post Office Address: 2128 Acton Street	City: Berkeley	State/Country: California	Postal Code: 94702

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature of Inventor 1
_____ Stephen P. Pope
Date

PA 3088716 v1

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) & 1.27(c)) - SMALL BUSINESS CONCERN

Applicant or Patentee: Stephen P. Pope
 Application or Patent No.: Unassigned
 Filed or Issued: Herewith
 Title: MAXIMUM LIKELIHOOD SEQUENCE ESTIMATOR WHICH COMPUTES BRANCH METRICS IN REAL TIME

I hereby declare that I am:

- ☐ the owner of the small business concern identified below:
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

Name of Small Business Concern: Mobilink Telecom
 Address of Small Business Concern: 2710 Walsh Avenue, Suite 20
Santa Clara, CA 95051-0971

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled MAXIMUM LIKELIHOOD SEQUENCE ESTIMATOR WHICH COMPUTES BRANCH METRICS IN REAL TIME by inventor(s) Stephen P. Pope described in:

- ☒ the specification filed herewith.
☐ Application No. _____, filed _____.
☐ Patent No. _____, issued _____.

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights in the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern that would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

Name _____
 Address _____

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

Name _____
 Address _____

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Name of Person Signing: _____
 Title of Person if Other than Owner: _____
 Address of Person Signing: _____

SIGNATURE _____
 PA 3088729 v1

DATE _____

00535000-00092960

Table 1. ALU and F-Generator Processing Steps versus Clock Modulus Value

MODULUS VALUE	mod = 0	mod = 1
ALU steps	A, D, G, H, J	B, C, F, I
F-Generator steps	1*, 3, 4, 5	2*, 6

Note *: Steps 1, 2 are for initial state only

Table 2. Required number of processing clock cycles

FSM Phase	No. processing clock cycles	Explanation
1. Forward trace init.	0	Reset memory
2. Forward trace	$2^L \times 2 \times N$	$2L$ states \times 2 clock cycles per state \times N trellis stages
3. Backward trace init.	0	Concurrent with stage N of forward trace phase.
4. Backward trace	N	N trellis stages \times one clock cycle per stage

Table 3. Memory requirement

Parameters requiring storage (Memory module)	Memory requirement, Block length N , channel memory L	Memory requirement (GSM) $N = 58$, $L = 5$, word = 16 bits
Branch metrics	None	0 bits
Correlations (Mem cor)	$L+1$ words	96 bits
State metrics (Mem j)	2×2^L words	1024 bits
Survivor bits (Mem a)	$N \times 2^L$ bits	1856 bits

Table 4. Register contents of prior knowledge about initial and final state for GSM

		RHS data block
Initial state	11000	$p_{22}p_{23}p_{24}p_{25}p_{26}^*$
Initial state mask	11100	00000
Final state	$p_1p_2p_3p_4p_5^*$	00011
Final state mask	00000	00111
Note * Midamble bit pattern = $p_1p_2 \dots p_{25}p_{26}$		

Table 5. ALU and F-Generator Processing Steps versus Clock Modulus Value

Modulus value	mod = 0	mod = 1	mod = 2
ALU steps	A, E, K	B, C, F, G	D, H, I, J
F-Generator steps	1*, 3, 4, 5		2*, 6

Note *: Steps 1, 2 are for initial state only